DOMINUS: NEMATODE AND PATHOGEN CONTROL AND IMPROVED WEED CONTROL WITH FOMESAFEN

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Few new chemical fumigants have been developed in recent years. One of the exceptions is a biofumigant with the active ingredient allylisothiocyanate, registered as the commercial product Dominus® (Isagro, USA). Excellent control of fungal plant pathogens and nematodes has been achieved with this material in the field, but weed control has been variable (Rosskopf, unpublished). Weed control with laboratory-grade AITC requires a minimum application rate of 750 kg/ha (Devkota and Norsworthy, 2014), nearly twice the labeled rate of the registered product, and more is required for control of purple nutsedge (Bangarwa and Norsworthy, 2014).

A factorial experiment was established comparing Dominus (30 gal/A) and an experimental organic acid treatment, SPK (1714 gal/A) drip applied under TIF, with or without the herbicide Reflex (ai fomesafen) applied at 1 pint/A in 30 gal/A with two Teejet VS11002 flat fan nozzles at 30 psi spaced 12 inches apart prior to plastic application. Each plot was split to accommodate planting of tomato and pepper. Soil samples were taken prior to application to determine baseline parasitic and non-parasitic nematode populations. Soil samples were again collected to determine post-treatment nematode community changes. In-field disease ratings were performed throughout the season beginning with seedling damping off and continued through root condition ratings following the final harvest. Weed emergence data was taken from the total length of each replicated plot. After the final harvest, plants were removed from the soil and plant growth measurements, including top weight, root weight, and stem caliper at crown were recorded. The roots were rated for galling and root condition. At the end of the season, nematodes were extracted from plant root tissue, counted, and identified. Plots were harvested twice and yield recorded based on fruit size.

In the tomato trial, there was no significant impact of either soil treatment ($p=0.5886$) nor herbicide ($p=0.0945$) on nutsedge, but in the pepper trial, herbicide application resulted in a significant decrease in nutsedge ($p=0.0036$; Fig 1.). Total combined weed counts through the plastic and in planting holes from pepper and tomato combined were significantly decreased by the herbicide application ($p=0.0053$). Tomato bacterial wilt, caused by *Ralstonia solanacearum*, resulting in plant mortality, was significantly lower in Dominus-treated plots than in other soil treatments ($p=0.0004$; Fig 2). Populations of root-knot nematode were effectively controlled using Dominus ($p=0.0055$) when compared to an experimental material and to the untreated check. Fruit yield, from both tomato and pepper, was greatest ($p<0.05$; Fig 3) with Dominus, followed by the experimental material, and finally the untreated check.

Devkota, P. and Norsworthy, J.K. 2014. Allyl isothiocyanate and metam sodium as methyl bromide alternatives for weed control in plasticulture tomato. Weed Technology 27:468-474.

Bangarwa, S.K. and Norsworthy, J.K. 2014. Purple nutsedge control with allylisothiocyanate under virtually impermeable film mulch. Weed Technology 28:200-205.

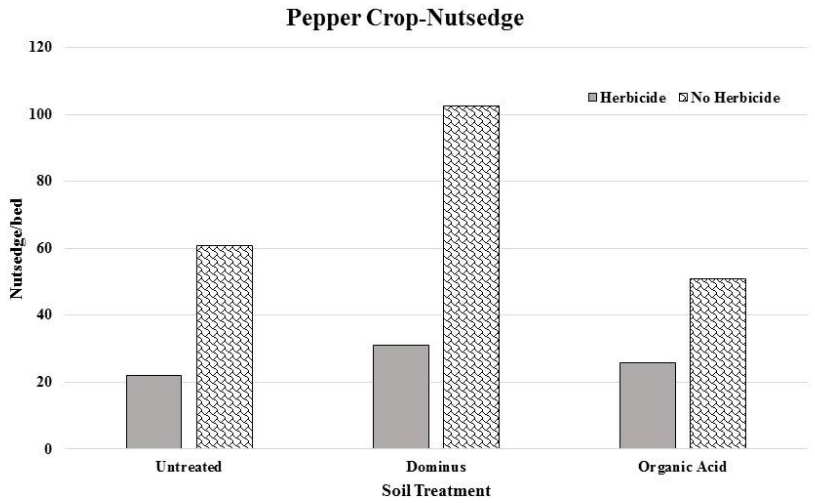

Fig. 1. Significant decrease in nutsedge emergence with herbicide application. There was no interaction between soil treatment and herbicide, but data is presented for all treatment combinations for clarity.

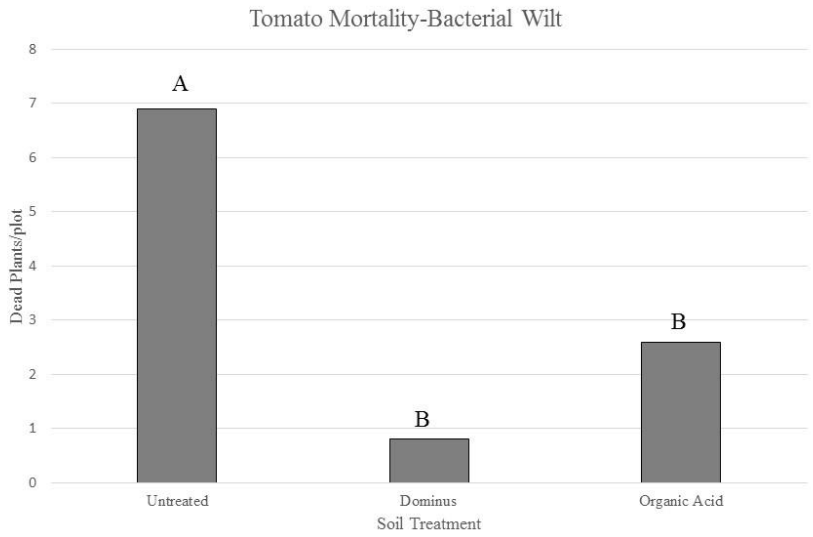

Fig. 2. Incidence of bacterial wilt of tomato. No significant herbicide effect. Bars with the same letters are not statistically significantly different (p=0.05).

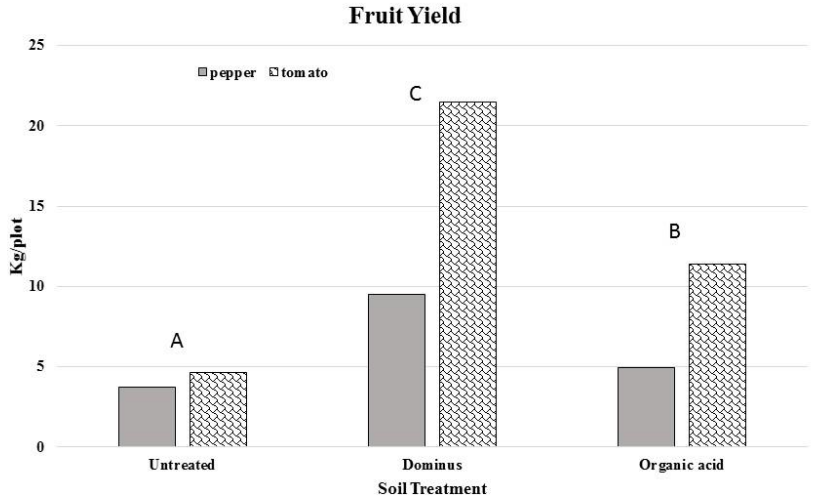

Fig. 3. Total marketable harvest of tomato and pepper. Soil treatment had a significant effect on yield (p=0.05) for both crops with Dominus resulting in the greatest yield.